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ABSTRACT

Context and input measures offer potential for vocational education program evaluation. Problems of measurement in context evaluation are primarily related to decisions on the appropriateness of data and how data should be interpreted. When program goals have been established, input evaluation is used to determine how available resources can be best employed to achieve those goals. Data for input evaluation usually are not available from existing sources and must be generated within the program. Five suggested methods are: group consensus, expert judgment, literature and program examination, management by objectives, and pilot experimental efforts. Literature and program examination, group consensus, and expert judgment are intended to solve the problem of cataloging the possible ways in which resources can be applied as well as to secure judgments about the potential of selected resource usage. A management by objectives stage or pilot experimental effort could follow with the allocation of specific resources applied to the achievement of intended outcomes. Both approaches have the advantage of generating a system for committing resources and examining the results of those commitments. Context and input evaluation, systematic ways of measuring the variables involved, will help in making improved program decisions. (EA)

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# REVIEW AND CRITIQUE OF CONTEXT AND INPUT MEASURES IN EVALUATION[1]

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## Overview

Although evaluations conducted in vocational education have improved materially over the past decade, this improvement appears to be rather narrow in scope. Many of the more recently developed evaluation plans and systems have focused on short and long range program effects without giving adequate consideration to the ways that other factors relate to these effects. The result has often been evaluations which do not touch on basic program planning (context evaluation) or structuring (input evaluation).

If one were to focus on evaluation as it relates to program improvement and do this in a more comprehensive manner, the result might be represented below. The

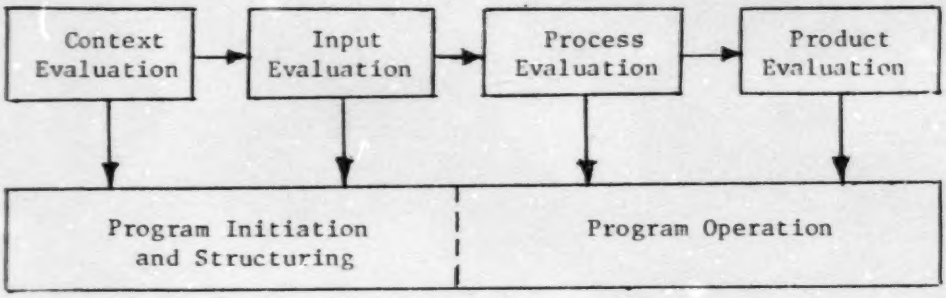


diagram is, in some respects, similar to Stufflebeam's evaluation model (Stufflebeam, 1969) in that it deals with context, input, process, and product. However, in this case, the overriding concern is with feedback for program improvement as contrasted with providing relevant information for decision makers.

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[1] Based upon a presentation made at the American Vocational Association Annual Convention, Anaheim, California, December, 1975.

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If these four aspects of evaluation are considered in light of curriculum building they correlate with program implementation and maintenance. In this regard:

Context evaluation deals with determining whether or not to offer a program and, if so, what its parameters will be including focus, goals, and objectives.

Input evaluation relates to deciding what resources and strategies will be utilized to achieve program goals and objectives.

Process evaluation focuses on determining what effect the program has on students in school.

Product evaluation deals with examining the program's effects on former students.

These aspects of evaluation each reflect the gathering of data which will be used to make decisions. However, collectively, they represent a means of providing both teacher and administrator with the kinds of information that are most useful as feedback for program planning and improvement.

Even though many evaluators recognize context and input evaluation as important parts of the total evaluation effort, they seem to avoid these areas because of problems in measurement. Strengths and limitations of process and product measures have been presented previously (eg. Bjorkquist and Finch, 1969; Finch and Bjorkquist, 1970). However, very little emphasis has been placed on the identification and verification of context and input measures. Wentling and Lawson (1975) and Worthen and Sanders (1973), for example, deal with evaluation to the virtual exclusion of context and input assessment. Thus, the evaluator is in a frustrating situation, knowing that context and input measures are important and yet not always being able to use those measures which are most relevant for his/her particular situation.

The basic intent of this paper is to identify, review, and critique those context and input measures which have potential for use when vocational education program evaluation is being conducted. Each identified measure is described and the strengths and weaknessess associated with it are detailed. It should be noted that context evaluation is organized around the content to be evaluated, whereas,

input evaluation is organized by methodology. The reason for this arrangement is that context evaluation is utilized to help determine what content should actually be in a program while input evaluation aids in decision making regarding the ways this content might best be provided to students.

## Context Measures

The primary function of context evaluation is to provide a rationale for determining educational program objectives. Vocational education planners are frequently in the position of having to decide whether or not instructional programs should be initiated or changed. This occurs in decisions about the establishment of new vocational schools and programs within existing vocational schools. Also, decisions must be made about possible changes in the objectives of programs that are operating. These changes are often in consideration of opportunities that are expanding but also include responses to conditions that suggest the discontinuation of programs or certain program objectives.

Vocational educators recognize that they function in a world of rapid and regular change. The technology of the occupations for which they are preparing and upgrading workers is communicated by employers, advisory committees, and literature of the field. Our society through its organizations, particularly the Congress and legislatures, has directed vocational educators to accommodate the occupational preparation needs of those with competitive disadvantages such as physical, mental and emotional handicaps, records of offenses against the law, and certain skin pigmentations. The structuring of jobs and the values which individual workers attach to their employment are changes of concern to vocational educators. Certainly, the state of the economy and its impact on the supply and demand of workers and the competitive nature of job seeking have not passed unnoticed by vocational educators. Within this seemingly amorphous state of conditions vocational

educators must make decisions and plan instructional programs which fit in the context of the environment in which they function.

While change factors represent one set of variables for context evaluation there is also a set of variables which act for program conformity. In context evaluation there is the measure that compares the actual and the intended performance of an instructional program. In the case of context evaluation it is a measure of how well operating procedures and documents such as mission statements, curriculum guides, staff-line organization and school calendars conform with goals and objectives (Stufflebeam, et al, 1971). As vocational educators work for consistency between their program intentions and their program operations, inertia is strengthened which is resistant to change. While the pressures for conformity and those for change and improvement may seem to conflict with each other they can be used to complement each other. This complementary action provides a cyclical strategy to "unfreeze - move - refreeze" (Lewin and Grabbe, 1945).

The dynamics of this process suggest that vocational educators reexamine the populations they serve, the intended program outcomes, and community employment information to identify opportunities for improvement. From this state, program goals are changed or reconfirmed and the program's mission statement, curriculum guides, calendar and the like are brought into conformity with the goals. This is a process which may occur for an entire vocational school at one time, but more likely will happen for single courses or even for single goals within a course. In an institution with several vocational offerings there may be several examples of each stage of the conformity-change process taking place at one time. This process may be at the school or school district level in which overall purposes and goals are subjected to study, at the level of considering the appropriateness of a single objective within a course or at any level in between. It is possible, and even likely, that context evaluation at different levels may be taking place within a single vocational education institution at one time.

Context evaluation is intended to make the determination of vocational program objectives a rationale process. The measurement of identifiable characteristics of the environment within which a vocational program operates can contribute to the data base used for setting program objectives. Drewes, Nerden, Lawrence, and Oglesby (1975) suggest three broad measures for use in context evaluation. These are community need for vocational education, extent of community support for education, and vocational education opportunities available.

Needs Assessment

The definition of need is certainly relative to prevailing conditions and the perceptions of society and individuals. There are many in our society who have the function of making us aware of our needs. The products of their efforts, such as television commercials, have helped us recognize our need to remove wax buildup in the corners of our kitchen floors and our need to stay looking young. At the same time, we are learning that we don't need some things we have, such as rooms heated at 72° and large families.

The measurements of the need for vocational education requires the reading of what society communicates. This communication is through public pronouncements, such as legislation, school board policies and public hearings. Accounts in the press, want ads and position statements by groups such as service clubs, civic groups and parents often express a need for vocational education. Data bases which are descriptive of population characteristics (eg. U.S. Census, school population census, Bureau of Labor Statistics reports) can provide information about the size, age distribution, birth rate, migration, delinquency rate and economic status of the population. Employment data about the size of the labor force, unemployment rates, projected supply and demand of workers are also available. The educational level of the population and subgroups within the population can be ascertained through public documents.

The amount of information available for assessing needs is relatively great. Much of this information is objective and reliable. The problem for the vocational educator is in the interpretation of the data. The identification of those who need vocational education and the specification of their needs are not easily extracted from available data. Prior to any interpretation, however, decisions must be made about the data that will be included for purposes of needs assessment. Employment data for labor markets to which the population never migrates will not apply. Statements by community groups need to be examined for their consistency with statements made by other groups and with existing data bases.

Existing data can be supplemented by data collection initiated by those conducting context evaluations. This data collection is most frequently in the form of surveys of student interests and employer needs.

The collection of data which may describe needs for vocational education can be facilitated by the systematic examination of the data. This necessitates the establishment of some initial parameters for program operation. These parameters should describe what vocational education means in the instance under consideration. For example, is vocational education viewed as a means for social rehabilitation, does it include occupations in public services, or does vocational education include occupational exploratory objectives? Within a framework describing a vocational program, whether it be at the national, state, local or individual course level, certain data will be saved while other data will be discarded.

It should be recognized that the initial parameters used to describe vocational education are subject to context evaluation. If these parameters are not periodically reexamined changes for improvement may not occur. The cyclical process to "unfreeze - move - refreeze" applies here.

The interpretation of needs data presents opportunities for growth but there is a risk factor. Seeking assurance of success before program initiation may result

in fewer program failures resulting from program changes. On the other hand, willingness to initiate change based on scanty data may lead to a high rate of program change and failure which may damage existing programs through resource drain and loss of credibility. In the interpretation of needs data the level of risk to be tolerated should be consciously stated in consideration of potential gains and losses.

Financial Support for Vocational Education

Support for vocational education can be measured by the extent of revenue used to finance programs. Dollars spent on vocational education do not give an adequate measure of financial support because of differences in the size of the population served and assessed valuation of taxed property. Millage rates and dollars available per school age person make revenues more interpretable. Comparisons of the proportion of local, state and federal dollars used for vocational programs also facilitate the interpretation of financial support. Changes in the level of support over a period of time help to interpret the data when inflationary factors are included. The proportion of dollars used for vocational programs as compared to other educational programs provides another base of comparison. Tuition payments by students and contributions made by business and industry are other measures of support.

Measures of financial support are needed when considering program objectives because of the impact that changes may have on program costs. With a static financial condition program goals must either result in the replacement of former goals or they must result in economies to make money available for additional program purposes. If neither of these alternatives occurs, the vocational program planner is in the position of having to estimate the potential for securing additional financial support.

The extent of financial support serves as a generalized measure of the acceptance of vocational programs. However, it does not respond quickly to public opinion of programs and may never respond to specific program features which are usually unnoticed by taxpayers. Financial support, as a context measure, is also contaminated by

economic conditions and the support given to education in general.

Educational Opportunities Available to Students

In context evaluation, the measure of educational opportunity availability is for the purpose of examining ongoing vocational education programs as a part of the environment in which the program being evaluated exists. For example, if consideration is being given to the initiation of a program to prepare entry level workers in a single occupation, programs that are already in operation in business and industry, military installations and other vocational schools within the pertinent geographical area should be factors in making the decision whether or not to begin a new program. To accomplish this there are several measures which should be made. The extent of vocational education opportunities available to potential students and related to the proposed program should be measured so they can be compared with available data about student demand for vocational education and employer demand for workers. The most difficult part of this task is not the measuring but rather deciding what is relevant to the case at hand.

To decide what should be measured, the geographic area in which other vocational programs are serving potential students has to be defined. Also requiring definition is the purpose of programs which are considered competitive to the proposed program. When these definitional problems are solved it is possible by survey techniques, interviews and examination of program descriptions to count the number of students who can be educated in a given content area by existing facilities. These data are meaningful when they can be compared with estimates of employer demand and student interest.

In measuring educational opportunity availability attention should be given to the objectives of programs that exist within the school that is considering the option of adding new programs. New occupational programs maybe generated by having students achieve some of the objectives of several existing programs. Conversely, objectives

for new programs maybe inclusive of one or more existing programs and thereby jeopardize their continuance.

## Input Measures

The actual use of input measures is rather restricted, with a basic prerequisite being that a decision has been made to offer a particular vocational program or set of programs. Since input evaluation is used to determine how existing resources might best be used to achieve program objectives, the evaluator should be aware that data-based decisions are somewhat more arbitrary than their counterparts in process and product evaluation. The logic for this is simple; input measures focus on intended rather than actual outcomes. Therefore, the extent to which input measures are meaningful depends upon their true relationships to program process and product. For example, a decision may be made to utilize team teaching in a vocational program because there is some feeling it will enable students to meet a greater number of program objectives. This decision obviously is classed as tentative until such time as data show team teaching to be a contributor to student achievement.

Input evaluation measures are used to help determine how available resources may be best employed to achieve specified program outcomes, whereas, process measures aid in determining if these resources have actually been utilized in the best possible ways. Since input evaluation preceeds process evaluation, input data can easily serve as an analytical frame of reference when the actual impact of these resources on students is being determined (Astin and Panos, 1971). Although the list of potential resources is expansive, they typically include teachers, teaching strategies, learning experiences, learning environments, and media. These are the grist of educational program building and their proper blending is considered to be closely related to program success. Sound input measurement should provide the planner with data necessary to aid in this blending process and a meaningful data base for use later when program process and product are being evaluated.

As input evaluation begins, it may be best to identify the resource base which is actually available to a program. This inventory of potential resources can be developed by systematically recording various items on hand for use in the instructional process. Some resources such as media are relatively easy to record as it is fairly simple to tell how many tape recorders, overhead projectors, and other hardware are available. Various learning environments can be noted with regard to work stations, equipment, etc. However, potential teaching strategies and learning experiences are more difficult to document since their actual use may be dependent upon the particular teacher involved with a program.

Input measures range from relatively simple to complex and from very subjective to objective. They collectively represent measurement associated with input evaluation. Measurement areas to be discussed include group concensus, expert judgement, literature and program examination, management by objectives, and pilot experimental efforts.

Group Concensus

Group concensus emerges as perhaps the most often used (and abused) basis for decision-making in the area of program structuring. Typically, concerned persons from the immediate locale (eg. teachers, administrators, advisory committee members) gather together and discuss what resources can be made available to a program and how they might best be used. After an interchange of ideas, a collective decision is reached and the teacher carries out the structuring process. Of course, this approach may not always be used. Sometimes the teacher is just handed the task of making program structuring decisions. If this is the case, he or she can set up a committee to help examine various instructional alternatives.

A basic limitation of the group concensus approach is in the people who compose it. Although group members all have good intentions they do not necessarily have

the appropriate technical and educational skills which are so important when professional decisions are to be made. The result of group deliberation then might be a pooling of ignorance or a decision made which does not align with the professional educator's views.

A second limitation of the group concensus process is its objectivity. Although everyone would like to think that their decisions are quite similar to others in the group, this may be far from true. There are, however, ways of determining the extent to which similarly in judgement exists. The Delphi technique can be used to both shape and assess concensus. Statistics such as the Kendall coefficient of concordance (Siegel, 1956) may be used if group members place rankings on the value of potential resources for a program. Although formal analysis is not frequently used, a sound data base can greatly improve the objectivity of the group concensus process.

Expert Judgement

As contrasted with group concensus, the expert judgement approach to determining program structure involves use of consultants from outside a school district or attendance area. These outside experts, who are selected because of their special skills, are brought in to examine the situation and recommend how resources might be employed to achieve certain objectives. The advantage of using outside experts is that they help to solve the "forest-trees" problem. Someone who is not close to the particular program may be able to forsee problems and/or alternatives that local personnel have not been aware of. Additionally, the experts' recommendations may garner great support by top administration just because they are outsiders.

From a negative standpoint, outside experts may be no better qualified to make recommendations than those who work in the school each day. It is, therefore, important to select consultants with extreme care and be sure that persons are hired who have proven credentials for this type of work. Closely aligned with the employment of experts is the money it will actually cost. Based upon the going rate, a school can expend several thousand dollars on consultant assistance quite easily.

A final concern about using outside experts is with the ways consultant data may be interpreted. If the experts' report is not clear or does not give consideration to certain aspects of the program, it may be played down or discounted. This would certainly be unfortunate since a large investment of time and money has, in effect, been wasted. Those who contemplate using outside experts might be better off considered all possible implications before the actual hiring takes place.

Literature and Program Examination

Quite often the examination of ongoing programs and literature describing these programs serves as a basis for decisions. This involves traveling to other locations and talking to those who are involved with relevant programs. Concurrent with this, magazines are reviewed to identify innovative programs that may serve as "models". Requests are then made for information about these programs via telephone and mail.

Although program developers may obtain valuable input by examining the literature and ongoing programs, there are several important concerns about this process. First, very few of the more innovative programs are actually written about in magazines. The reason for this is a great deal of time is being spent innovating and very little is left for writing. In fact, some of the best programs are not nationally known and the only way of finding out about them is through word of mouth.

Second, the examination process is usually conducted in a manner which is far from systematic. Very seldom is use made of the ERIC system to search out appropriate programs. Computerized information retreval systems make it possible to gain access to numerous information sources. Abstracts can then be rapidly reviewed and complete copies of reports can be examined on microfiche.

A third concern is with the lack of systematic effort employed in the examination process. In some cases, ongoing programs are examined before anything is known about the range of possible resources that can be selected from. In other cases, people

have a vague idea about what they want to do but have not explored the area enough to actually know the consequences of a certain approach or set of approaches. For example, a program developer may say "We must have individualized instruction," without realizing the range of possibilities in this area or the costs incurred when one chooses to individualize on a wholesale basis. In this regard, Gibbons (1970) has made use of a profiling procedure that can be applied to program examination. This procedure has the potential to make the search and review process much more systematic.

Management by Objectives

Many consider management by objectives (MBO) as a system to be used once a program has been initiated. In reality, MBO extends from program conception through initiation and maintenance. MBO can be described as:

> "a process whereby the superior and subordinate managers of an organization jointly identify its common goals, define each individual's major areas of responsibility in terms of the results expected of him, and use these measures as guides for operating the unit and assessing the contribution of each of its members" (Odiorne, 1965)

In terms of input evaluation, MBO may be viewed as a commitment to achieve certain specified program and individual goals and objectives with certain resources (eg. teachers, media, equipment, facilities) and given students with certain characteristics. Application of MBO concepts to the program initiation stage enables each professional to know where he or she stands with regard to stated objectives and the resources needed to meet these objectives. For example, a vocational teacher may state that X number of students will meet Y objectives if Z resources are provided. If necessary resources are then provided, the teacher is obligated to see that students meet the specified objectives.

The advantage of using MBO in this manner rests in its bridging the gap between input and process and product evaluation. If mutual agreement can be reached with regard to objectives to be attained and resources to be employed, a very meaningful

base has then been established for the conduct of process evaluation. Of course, the above is based upon an assumption that both teacher and administrator can make valid decisions regarding the meeting of specified objectives. If this is not the case, serious problems may arise after the program has been initiated.

Pilot Experimental Efforts

A final input evaluation approach consists of conducting pilot experimental efforts to aid in making decisions about the program structure. It might be that alternate resources could possibly be used to meet certain objectives but little is known about the efficiency associated with these resources. By means of pilot experimental work, the strengths and weaknesses of various resources could be identified and appropriate decisions made accordingly. In conducting the experiment or experiments, consideration must be given to maintaining internal and external validity (Campbell and Stanley, 1963). However, the evaluator may want to opt for a quasi-experimental design if randomization of subjects is impossible.

The educational experiment is perhaps the most powerful approach to gathering data for program decision-making. If well conducted, the experiment can provide results which are objective and should represent what the program will be like once it is operational. However, pilot experimental efforts are not without their limitations. Setting up and conducting any experiment is extremely time consuming and requires a great deal of coordinated effort. This sort of time line may fit in well with the evaluator's schedule but raise havoc with the administrator's plans. Another shortcoming is the narrow focus which most experiments have. Instead of dealing with resources on a global basis, the experimental approach dictates focus on one or two specific variables associated with the instructional process. Persons who contemplate using pilot experiments as part of input evaluation should keep these shortcomings in mind.

## Summary

Measures for context and input evaluation do not fall within the methodology typically included in educational measurement. Some may feel more comfortable in describing the processes suggested as means of assessment rather than measurement. Others may have considered the sizing up of the context of and input to vocational education more a matter of speculation than anything else. The major point of this presentation has been to describe a systematic way of examining context and input factors and to critique the strengths and weaknesses of measures of these.

The problems of measurement in context evaluation are not primarily in data collection. There are more substantial problems in deciding which data are appropriate and how these data should be interpreted.

A framework needs to be described to help decide the appropriateness of the data for setting goals. Paradoxically, this framework cannot be viewed as fixed and will periodically change as part of the "unfreeze - move - refreeze" process.

In the interpretation of context data, risks in changes can be reduced by increasing the expectation of consistency of the data. However, opportunities for improvement will be missed if too high a level of consistency is expected before action is taken.

When program goals have been established, input evaluation is used to determine how available resources can be best employed to achieve those goals. The resource base to be applied to the accomplishment of program goals is usually well described and the problem is to decide which resources will be used for which purposes. There are many ways in which a resource base can be applied to a set of program purposes to achieve the greatest effect relative to those purposes.

Unlike the situation in context evaluation, data usually are not available from existing sources and must be generated within the program for input evaluation.

Therefore, attention must be given to the processes of data collection. Five methods were suggested and critiqued: group consensus, expert judgement, literature and program examination, management by objectives, and pilot experimental efforts.

An early problem for the input evaluator is in cataloging the possible ways in which resources can be applied. Literature and program examination are intended to help solve this problem as are group consensus and expert judgement. These methods can also be used to secure judgements about the potential of selected resource usage. A management by objectives stage or pilot experimental effort could follow with the allocation of specific resources applied to the achievement of intended outcomes. Either of these approaches has the advantage of generating a system for committing resources and examining the results of those committments. Moving directly from the point of cataloging possible resource use options and selecting an option for implementing a program all too frequently does not result in additions to the knowledge base for future input evaluations.

The problems of setting program goals and allocating resources to the achievement of goals will be with us as long as we continue to offer instructional programs. We need to do a more systematic job of measuring the variables involved so better decisions can be made. These are the functions of context and input evaluation.

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